

# NOTES ON FREETOWN MOSQUITOS, WITH DESCRIPTIONS OF NEW AND LITTLE-KNOWN SPECIES

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## PLATE VII

The material dealt with in this paper was collected in the course of a recent survey of the mosquitos of Freetown by Professor D. B. Blacklock and the writer. During the survey very valuable assistance was rendered by Dr. H. O'Hara May, Deputy Director of Sanitary Services, and by the officials of the Sanitary Department, who submitted to us for identification about three hundred consignments of larvae, many of them from tree-holes in Freetown and at Hill Station. I am also indebted to Dr. M. G. Blacklock, Dr. R. M. Gordon and Dr. G. MacDonald, for specimens of larval and adult mosquitos.

The following non-anopheline mosquitos are recorded:—

- |  |  |
|--|--|
| <i>Culex albiventris</i> Edw.                  | <i>A. (Aedimorphus) simulans</i> Newst., and<br>Carter     |
| <i>C. annulioris</i> Theo.                     | <i>A. (Aedimorphus) tarsalis</i> Newst.                    |
| <i>C. decens</i> Theo.                         |  |
| <i>C. decens</i> var. <i>invidiosus</i> Theo.  | <i>Uranotaenia balfouri</i> Theo.                          |
| <i>C. duttoni</i> Theo.                        | <i>U. conalli</i> Edw.                                     |
| <i>C. grabami</i> Theo.                        | <i>U. fusca</i> Theo.                                      |
| <i>C. horridus</i> Edw.                        | <i>U. nigripes</i> Theo.                                   |
| <i>C. (Culicomymia) nebulosa</i> Th.           | <i>U. ornata</i> Theo.                                     |
| <i>C. (Culicomymia) cinereus</i> Theo.         |  |
| <i>Lutzia tigripes</i> var. <i>fusca</i> Theo. | <i>Hodgesia sanguinis</i> Theo.                            |
|  | <i>Ficalbia mediolineata</i> Theo.                         |
| <i>Aedes (Stegomyia) africana</i> Theo.        | <i>Harpagomyia trichorostris</i> Theo.                     |
| <i>A. (Stegomyia) argenteus</i> Poiret.        | <i>Megarbinus brevipalpis</i> Theo.                        |
| <i>A. (Stegomyia) blacklocki</i> Evans         | <i>M. aeneus</i> n.sp.                                     |
| <i>A. (Stegomyia) fraseri</i> Edw.             | <i>M. ? phytophagus</i> Theo.                              |
| <i>A. (Stegomyia) luteocephala</i> Newst.      | <i>Erectmopodites chrysogaster</i> Graham                  |
| <i>A. (Stegomyia) simpsoni</i> Theo.           | <i>E. chrysogaster</i> var. <i>semisimplicipes</i><br>Edw. |
| <i>A. (Stegomyia) vittata</i> Bigot            | <i>E. dracaenae</i> Edw.                                   |
| <i>A. (Finlaya) longipalpis</i> Grünb.         | <i>E. inornatus</i> Newst.                                 |
| <i>A. (Aedimorphus) albocephalus</i> Theo.     | <i>E. leucopus</i> Graham                                  |
| <i>A. (Aedimorphus) apicoannulata</i> Edw.     | <i>E. oedipodius</i> Graham                                |
| <i>A. (Aedimorphus) domesticus</i> Theo.       |  |
| <i>A. (Aedimorphus) occidentalis</i> n.sp.     |  |

The following table shows the results obtained by the identification of Culicine mosquitos from a considerable number of natural sources, including 156 records from rot-holes in living trees. The species of *Megarhinus* and *Eretmopodites* and certain species which occurred in small numbers are not recorded in the table. Many larvae were found in rock-pools in the beds of streams, but as these situations were examined chiefly for the presence of *Anopheles*, the Culicine larvae were in most cases not kept for identification.

TABLE I.

Situations in which larvae were found	Number of consignments of larvae determined											
	<i>A. (A.) apicoannulatus</i>	<i>A. (S.) luteocephalus</i>	<i>A. (S.) fraseri</i>	<i>A. (A.) occidentalis</i>	<i>A. (F.) longipalpis</i>	<i>A. (A.) simulans</i>	<i>A. (S.) simpsoni</i>	<i>A. (S.) argenteus</i>	<i>C. (C.) nebulosa</i>	<i>A. (S.) vittatus</i>	<i>A. (A.) abbocephalus</i>	<i>U. nigripes</i>
Rot-holes in living trees (various)	43	10	3	2	6	10	5	29	19	...	...	...
Rot-holes in living mango trees...	8	5	4	2	...	6	1	8	5	...	...	...
Rot-holes in living pawpaw trees	2	4	...	...	...	...	1	8	11	...	...	...
Rot-holes in living cotton trees...	2	1	...	2	...	...	...	6	1	...	...	...
Pool formed by roots of cotton trees ... ..	...	...	...	1	...	1	...	1	...	...	...	...
Dracaenas ... ..	1	...	...	...	...	1	12	1	...	...	...	...
Axils of leaves of liliaceous plants	...	...	...	...	...	...	5	2	...	...	...	...
Dead stumps of banana plants ...	3	...	...	...	...	...	3	1	...	...	...	...
Cut stems of bamboos ... ..	1	2	...	...	...	...	...	...	...	...	...	...
Pineapple plants ... ..	...	...	...	...	...	...	...	...	...	...	...	...
Hollows in flat stones ... ..	...	...	...	...	...	...	...	1	3	2	...	...
Rock-pools ... ..	...	...	...	...	...	3	...	2	3	10	2	1
Rock-pools in stream-beds ...	...	...	...	...	...	...	...	...	...	8	...	4

*Aedes (Aedimorphus) occidentalis* n.sp.

*Aedes apicoannulatus* Edwards, *Trans. Roy. Soc. Trop. Med. and Hyg.*, Vol. XVI, p. 500.

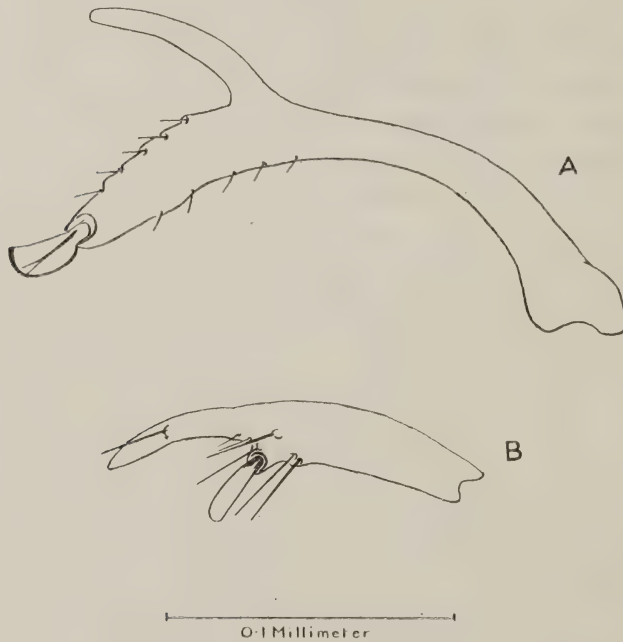
*Ochlerotatus apicoannulatus* Ingram and Macfie, *Bull. Ent. Res.*, Vol. VIII, p. 144.

It was found that amongst the large numbers of *Aedimorphus* with apically banded tarsi there were two distinct species in addition to *A. simulans*, N. and C., which has characteristic mesonotal spots of narrow, silvery scales. One of these species was entirely without white scales on the thorax; it was present in numbers enormously greater than the other species, which possessed anterolateral stripes of flat white scales on the dorsal surface of the thorax. The side-pieces of the male hypopygium were quite distinct in the two species and the larvae exhibited striking differences. The less common species with the thoracic stripes has hitherto usually been identified with *apicoannulata* Edw., but Mr. Edwards, who kindly compared examples of both species with Theobald's type of *Aedimorphus alboannulatus* (Edwards bestowed the new name "*apicoannulata*" in 1912, *alboannulatus* being preoccupied), informed me that the commoner mosquito with unornamented thorax agreed with the type. The rarer species must, therefore, be regarded as new and the name *occidentalis* is proposed, as this species is the western representative of two closely-allied African species (Edwards, 1923, p. 500). As the characteristics of this mosquito have been referred to by Edwards (1923, 1925), a full description does not seem necessary. The new species differs from *A. apicoannulatus* Theo. chiefly as follows:—The proboscis is entirely dark scaled; there are large paired patches of broad silvery scales immediately behind the eyes; in *A. apicoannulatus* the pale scales in this position are very narrow and yellowish; the mesonotum is adorned with paired stripes of silvery scales on the anterior margins, extending backwards to the scutal angle, the stripes consisting in front of two layers of outwardly directed flat scales and, behind, of irregularly arranged flat scales directed obliquely backwards. Dark scales of mesonotum unmixed with paler ones; in *apicoannulata* there is an admixture of yellowish-brassy scales among the dark ones of the mesonotum, but no definite pattern formed by pale scales. The male hypopygium

shows striking differences from that of *apicoannulata*; the claspers have been figured by Edwards (1923), but they are illustrated here (fig. 1, B) for comparison with those of that species. The larva has been fully described by Ingram and Macfie (1917); the chief differences between it and the larva of *apicoannulata* are tabulated on p. 102. Type ♀ and two cotype ♂♂ reared from larvae found in tree-holes, Freetown, 6, VIII.25, by officials of the Sanitary Dept., Sierra Leone.

*A. (Aedimorphus) apicoannulata* Edw.

This species appears to be by far the commonest tree-hole breeding mosquito in Freetown, at any rate during the wet season. The male hypopygium differs from that of *A. occidentalis* n.sp., in the form of the claspers (fig. 1, A and B), and in the possession of rudimentary claspettes, partially fused with the internal surface of the side-pieces,



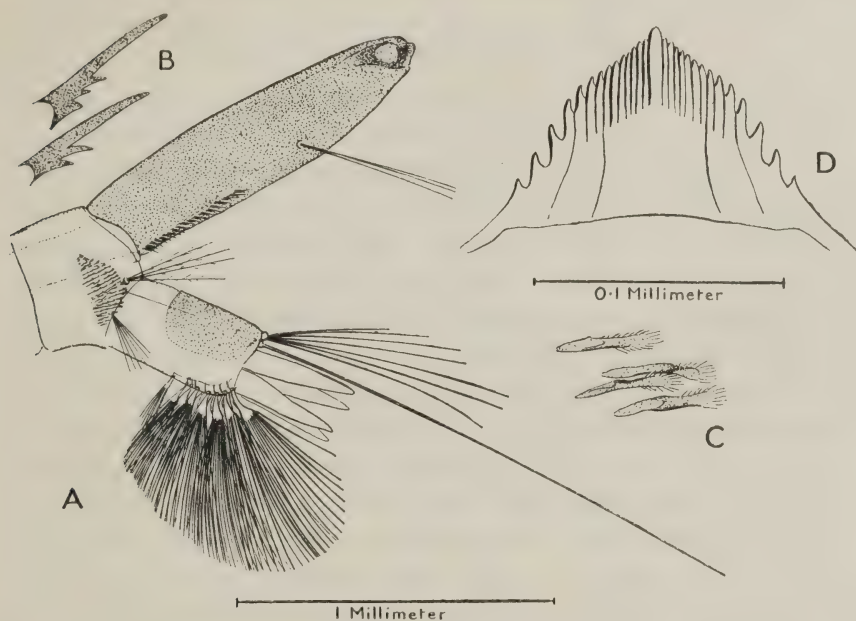
A.M.E.

FIG. 1. Clasper of male hypopygium. A—*A. apicoannulata*;  
B—*A. occidentalis*.

and bearing two strong spines at their extremities. The clasper in *A. simulans*, N. and C., is not distinguishable from that of *apicoannulata*, but the claspettes of the former species bear hairs instead of spines.

*Larva.* Fourth stage.

*Head.* Antenna curved, with a sub-median tuft of five hairs, and shaft sparsely spinose. Mid frontal hairs plumose. Mental plate (fig. 2, D) with a median tooth and fourteen teeth on each side, of which the inner seven or eight are very small and close together. First and second segments of abdomen with very stout, plumose, multiple hairs laterally, that on the first with four or five, that on the second with three or four branches. Lateral combs (fig. 2, A, C) consisting of sub-triangular patches of very numerous



A.M.E.

FIG. 2. *A. apicoannulata*, larva. A—eighth and ninth segments; B—pecten spines; C—comb spines; D—mental plate; B and C to the same scale as D.

(about eighty) small, elongate fringed spines. Siphon tube with the length four times the greatest width; pecten consisting of nineteen barbed teeth; tuft of two or three long hairs, reaching to or slightly beyond the apex of the siphon. Dorsal hairs of anal segment consisting of a tuft of seven hairs, and a hair arising from a separate base exceeding twice the length of the longest hairs of the tuft.

Table showing chief differences between the fourth stage larva of *A. apicoannulata* and *A. occidentalis*.

	<i>A. apicoannulata</i> Edw.	<i>A. occidentalis</i> n.sp.
Mental plate ... ..	With 19 teeth	With 29 teeth
Lateral combs ... ..	11-12 spines in an irregular row	About 80 spines in a sub-triangular patch
Tuft of siphon tube ... ..	6 hairs	2-3 hairs
Dorsal hairs of anal segment ...	3 and 1	7 and 1

*Megarhinus (Toxorhynchites) aeneus* n.sp.

FEMALE. *Head.* Occiput with brilliant peacock-blue scales in front, and narrow, pale greenish scales with golden reflections behind and at the sides; a border round the eyes narrow and purplish above, broader and white below. Proboscis and palpi with deep violet scales, those of palpi with bright blue reflections at the apices of the segments. *Thorax.* Prothoracic lobes with golden bristles and metallic blue scales with violet reflections above, and darker bristles and ochraceous golden scales below. Mesonotum with bright yellow setae in front, scales dull green appearing bronzy in certain aspects, brighter and more bluish-green scales on and near the scutellum and a small patch of bright blue scales over the wing root. Setae of scutellum and above wing root deep golden; pleurae golden yellow with flat, white scales forming a broad median longitudinal band; scales above and below this band yellow with pale green iridescence. *Abdomen.* Dorsum with first segment clothed with metallic green scales with yellow reflections, rest of segments with metallic violet-pink scales with coppery reflections, lateral edges of tergites with small basal areas of paler metallic scales; sixth and seventh segments with small apical, lateral tufts of flame-coloured setae. Venter brilliant golden with pink and green reflections, seventh segment with broad median distal area of dark purplish-brown scales. *Legs.* All femora golden internally almost to the apex, and on the basal third or half externally, a line of golden scales extending on to the dark area for most of its length. Front tibia with dark metallic scales, middle tibia pale scaled on basal three-

fourths behind, hind tibia with a proximal line of pale greenish scales and a conspicuous patch of creamy-white scales at the outer third beneath. Front tarsi with lines of whitish scales beneath the first two segments, most conspicuous on the second; mid tarsi with white basal bands on the first two segments, that of the second being about two-thirds of its length; hind tarsi with sub-basal white band on the first segment, second segment entirely dark and third segment with a broad basal creamy-white band. *Wings.* Scales with metallic greenish reflections, posterior border with emargination well marked, length of wing about 5 mm.

*Pupa.* Respiratory trumpets with the opening deeper than in *M. brevipalpis* Theo. (Macfie and Ingram, 1923), the ratio of the length of the closed portion to that of the whole about 1 : 1.9. Paddles closely resembling those of *M. brevipalpis*. Macrochaetae of abdomen differing considerably from those of that species, lateral only present on fifth segment, projecting at right-angles; second segment with sub-lateral macrochaeta about equal in length to the segment behind; sub-median slightly shorter, a large trifold seta just internal to sub-median, its branches about equal in length to this seta. Third, fourth and fifth segments with sub-median about equal in length to the segments, sub-lateral considerably longer, that of the fifth extending beyond the distal border of the seventh segment; sixth segment with only sub-lateral represented, seventh and eighth segments without macrochaetae.

Type: one female bred from a larva taken from a tree-hole at Hill Station, Freetown, 29.vii.1925, by an officer of the Sanitary Department, Sierra Leone.

A second specimen bred from a larva taken from a hole in a Mango Tree at Hill Station, 11.vi.1924, differs in the amount of white on the legs. The front and mid tibiae are entirely dark-scaled and the hind tibiae have only a trace of the distal white patch. The front tarsi are without any pale scales and the middle tarsi have the white band on the second segment narrower than in the type. The pupal pelt shows considerable differences in the abdominal chaetotaxy, although it differs much more from *M. brevipalpis* in this respect; in the absence of a large series of specimens for comparison, it is impossible to say whether this represents a distinct species.

*Anopheles smithii* Theo. (1905) (Pl. VII).A. (*Feltinella*) *pallidopalpi* Theo. (1907).

The above synonymy which was put forward by Christophers (1924) in his 'Provisional List and Reference Catalogue of the Anophelini' has been confirmed by the examination of a large series of adults of both sexes reared from larvae collected at Mount Aureole, Freetown, by Professor Blacklock and the writer. The larvae, which are described by Blacklock and Evans in a paper published concurrently with this, are very characteristic, and show little variation. The adults, however, exhibit a striking dimorphism in the wing markings of the two sexes, the females having the pale spots so much reduced that the wings appear quite dark to the naked eye, while the wings of male specimens have well-developed *Myzomyia* spotting. The confusion to which this peculiarity has given rise is increased by the fact that in each sex the wing markings exhibit a striking degree of individual variation. A short account of the species with special reference to the wing markings is as follows:—

FEMALE. General colouration black; palpi with three narrow, rather obscure, pale bands; mesonotum clothed chiefly with hairs, scales being present only on the anterior promontory (Christophers, 1924) legs entirely black-scaled. *Wings*. The most extensively pale scaled specimens (Pl. VII, A) show small spots at the following points:—costa: just beyond the end of the sub-costa, at the apex and between these points; sub-costa: about mid-way between base and apex; first vein: near the base, opposite the sub-costal spot, opposite the sub-apical and (sometimes) apical costal spots; wing field: at the base of the fork cells; on the second, third, fourth and upper branch of fifth vein in the region of the cross-veins. This condition occurred in about one-third of the specimens; in others one or more of the pale spots were absent, but the suppression of some of the spots and retention of others was entirely promiscuous, and almost every possible variation of pattern was observed. In two examples pale scales were entirely absent and in several specimens only two or three obscurely pale scales were present. Spots may be reduced almost to extinction either by reduction of the number of pale scales involved or by being rather dusky so that the contrast



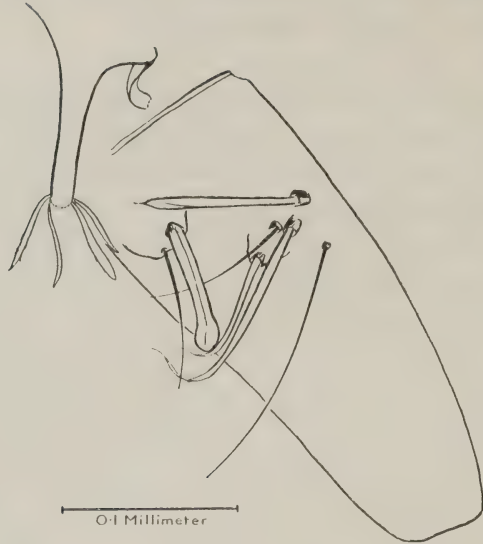
with the dark scales is not well-marked. Usually the two wings of the same specimen were of similar pattern.

Wing length: 2·8 to 3·5 mm.

MALE. The male is considerably lighter in appearance than the female owing to the extensive white scaling of the wings. The characters of the head, palpi, mesonotum, abdomen and legs did not show any marked variation and agreed with those of *A. pallidopalpi* as described by Theobald (1907). *Wings.* Theobald's description of the wing markings would apply to some of the specimens met with; the majority of our specimens, however, had the basal border spot involving the costa as well as the first vein, a condition which Theobald noted in one of his specimens. Typical examples with well-developed spotting (Plate VII, B) showed, in addition to the three large white spots involving the costa and first vein, a small apical spot. There were also well-marked spots in the following situations:—first vein: towards the base and just beyond the first border spot ('accessory sector spot,' Christophers); at the bases of the fork cells; at the cross-veins; on the basal half of the third vein; two extensive areas on the fifth vein and two smaller ones on its upper branch; one on the sixth.

In two exceptional cases a large white area also occurred distally on vein three. Other specimens showed reduction of some of the pale areas, the reduction, as in the female, not following any definite plan but involving sometimes one, sometimes another spot or combination of spots. The paleness of the scales also varied greatly in intensity.

HYPOPYGIUM (fig. 3). Christophers (1925) refers to the *Myzomyia*-like character of the hypopygium in imperfectly displayed specimens in the British Museum, labelled *smithii* and *pallidopalpi*. Our material shows that three of the five parbasal spines are very broad, the outermost being almost blade-like.



A.M.E.

FIG. 3. *A. smitbii*. Side-piece and phallosome of male hypopygium.

#### REFERENCES

- CHRISTOPHERS, S. R. (1924). Provisional List and Reference Catalogue of the Anophelini. *Ind. Med. Res. Memoirs*, Memoir No. 3.
- EDWARDS, F. W. (1912). A Synopsis of the species of African Culicidae other than Anopheles. *Bull. Ent. Res.*, Vol. III, p. 1.
- (1923). Mosquitos reared by Dr. W. E. Haworth from coconut palms in East Africa. *Trans. Roy. Soc. Trop. Med. & Hyg.*, Vol. XVI, p. 498.
- (1925). Mosquito Notes.—V. *Bull. Ent. Res.*, Vol. XV, p. 257.
- INGRAM, A., and MACFIE, J. W. S. (1917). The Early Stages of certain West African Mosquitos. *Bull. Ent. Res.*, Vol. VIII, p. 135.
- MACFIE, J. W. S., and INGRAM, A. (1923). The Early Stages of West African Mosquitos.—VI. *Bull. Ent. Res.*, Vol. XIII, p. 409.
- THEOBALD, F. V. (1905). New Culicidae from the West Coast of Africa. *The Entomologist*, Vol. XXXVIII, p. 101.
- (1907). Mono. Culicidae.—IV, p. 56.

PLATE VII

EXPLANATION OF PLATE VII

*Anopheles smithii* Theo.

- A. Wing of female.
- B. Wing of male.